ASYMPTOTIC EXPANSION FOR LAYER SOLUTIONS OF A SINGULARLY PERTURBED REACTION-DIFFUSION SYSTEM

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ABSTRACT. For a singularly perturbed system of reaction–diffusion equations, assuming that the 0th order solutions in regular and singular regions are all stable, we construct matched asymptotic expansions for formal solutions to any desired order in ϵ. The formal solution shows that there is an invariant manifold of wave-front-like solutions that attracts other nearby solutions. With an additional assumption on the sign of the wave speed, the wave-front-like solutions converge slowly to stable stationary solutions on that manifold.

1

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